The Effect of SMEs on Economic Growth: The Case of Thailand

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ABSTRACT

Small and medium-sized enterprise (SMEs) have a crucial role in Thailand's economy, both financially and socially, introducing them as a key strategic actor in the country's economy. In this study, we analyzed the possible impact of credits to SMEs (LNSMECR) on Thailand's long-term economic growth (LNGDP). In order to evaluate this possible connection, we included real interest rate (LNIR) and money supply (M2) in our model of economic growth in Thailand. The analysis drew on a sample of data collected quarterly between 2013 Q1 and 2022 Q3. The ARDL framework by Pesaran et al. (2001) was utilized in this study. In long-term, LNSMECR and LNGDP were found to move together.

Keywords: SMEs, ARDL, Economic growth

ÖZ

Küçük ve orta ölçekli işletmeler (KOBİ'ler), Tayland ekonomisinde hem finansal hem de sosyal açıdan çok önemli bir role sahiptir ve onları ülke ekonomisinde kilit bir stratejik aktör olarak tanıtmaktadır. Bu çalışmada, KOBİ'lere verilen kredilerin (LNSMECR) Tayland'ın uzun vadeli ekonomik büyümesi (LNGDP) üzerindeki olası etkisini analiz ettik. Bu olası bağlantıyı değerlendirmek için Tayland'daki ekonomik büyüme modelimize reel faiz oranını (LNIR) ve para arzını (M2) dahil ettik. Analiz, 2013 Q1 ile 2022 Q3 arasında üç ayda bir toplanan bir veri örneğinden yararlandı. Pesaran ve diğerleri tarafından ARDL çerçevesi. (2001) çalışmasından yararlanılmıştır. Uzun vadede LNSMECR ve LNGDP'nin birlikte hareket ettiği görüldü.

Anahtar Kelimeler: SMEs, ARDL, Ekonomik büyüme

To My Family and My Love

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INTRODUCTION

Due to its social and financial importance, Small and Medium-sized Enterprises (SMEs) are the strategic players of Thailand's economy. However, the significant role of SMEs is not only limited to their systematic impact: the quicker adaptation to market changes, lower overhead costs, and their competitiveness introduce SMEs as innovative and flexible entities of the economy (Stiglitz, 2012; Grimm & Siegel, 2017). According to the Central Bank of Thailand (BOT), the number of SMEs in Thailand was approximately 3.13 million in 2020, which accounted for 99.6% of Thai enterprises. The large contribution of SMEs to Thai economy highlights SMEs as one of the main actors driving Thailand's economy. On the other hand, SMEs are generally financed through debt (Rao et al., 2021). According to BOT, in 2020, credits to SMEs were 37.27% of the total outstanding loans to enterprises (THB 3,409,192 billion). Given the crucial role of SMEs in the economy and that the less restrictions regarding the credits to SMEs invites more SMEs to the economy, this study aims to shed light on the dynamic interaction between credits to SMEs (SMECR) and long term economic growth in Thailand. To this end, we examine the relationship among Gross Domestic Product (GDP), SMECR, money supply (M2), and real interest rate (IR) via Auto Regressive Distributed Lags (ARDL) framework (Pesaran et al., 2001).

According to European Union (EU), SMEs are defined based on the staff headcount and their turnover/assets value. Micro enterprises have less than ten employees with a turnover or total balance sheet value of less than or equal to € 2 million. Small

enterprises are considered as entities with a staff headcount less than 50, and an asset value (or a turnover) less than or equal to € 10 million. The definition of medium-sized enterprises, however, is slightly different. If an enterprise has less than 250 staff and a balance sheet total less than or equal to € 43 million it will be considered as a medium-sized enterprise. In addition, if the enterprise, instead of a balance sheet total of € 43 million, has a turnover less than or equal to € 50 million is still categorized as a medium-sized. In Thailand, according to the ministerial regulations issued by the Ministry of Industry in 2002, SMEs definition is also a function of the industry in which they are present.

Table 1. SMEs categories

	Manufacturing Industry	**Retailing Industry**	**Service Industry**	**Wholesale Industry**
Small Enterprise	Number of employees: ≤ 50 **Or** Assets value: < 50	Number of employees: ≤ 15 **Or** Assets value: < 30	Number of employees: ≤ 50 **Or** Assets value: < 50	Number of employees: ≤25 **Or** Assets value: < 50
Medium Enterprise	Number of employees: 51 to 200 **Or** Assets value: 50 to 200	Number of employees: 16 to 150 **Or** Assets value: 30 to 60	Number of employees: 51 to 200 **Or** Assets value: 50 to 200	Number of employees: 26 to 200 **Or** Assets value: 50 to 100

Note: The assets values have been reported in million THB (Thai Baht).
The value of the lands is excluded from the asset value.

SMEs are the fuel to Thailand's economy and are responsible for generating a considerable proportion of employment and output (OECD, 2018). Their ability to develop innovative products and services, as well as their capability to respond quickly

to market fluctuations are among the striking features of SMEs. Consequently, the significance of SMEs can be addressed from three perspectives: job creation, economic growth, and innovation.

SMEs are one of the main sources of job creation in Thailand. According to the Office of Small and Medium-sized Enterprises Promotion (OSMEP), the number of job creation by SMEs surpassed 10 million as of 2019, which was the highest among domestic businesses. SMEs typically demonstrate more flexibility and responsiveness compared with large firms. This flexibility is reflected in their relatively low risk-aversion and their tendency to experiment unorthodox business models. Hence, allowing them to create new jobs and fill gaps in the labor market that large firms may not be able to address. Thanks to their business culture, compared to larger corporations, SMEs are more likely to hire people who might otherwise be unable to find work. Hiring employees with disadvantaged backgrounds is a case in point; a case that is not common among other organizations due to the prevalent corporate culture in Thailand. Therefore, SMEs are one of the forces against poverty and inequality in Thailand.

Moreover, SMEs are the backbone of local economy in Thailand. SMEs usually invest in their local community, which gives rise to regional economic development (Gherghina et al., 2020; Huggins & Thompson, 2010). Given the nationwide spread of SMEs in Thailand, such regional developments can bring economic development to the whole economy. However, SMEs may affect economic growth through contributing to economic development (Flammang, 1979).

SMEs are also highly innovative: this is partly due to the less restriction and agility of SMEs. They are typically able to take advantage of new opportunities and create novel products and services faster than large companies. This can be particularly important in industries where innovation is key to staying competitive. Also, innovation and economic growth are interconnected, linking SMEs as one of the innovation engines of the economy to economic growth (Ulku, 2004; Verspagen, 2006; Grimm & Siegel, 2017; Diebolt & Hippe, 2022).

As a developing country, economic growth is a building block for Thailand's transition to a developed stage. Economic growth can be translated to the augmentation of the real market value of the goods and services produced within an economy during a fiscal year. The financial structure of the economy is one of the catalysts for the economic growth. Financial structure must be designed aiming to provide efficient methods of payment, and to improve the allocation of resources across space and time. Furthermore, an efficient financial structure must be able to facilitate the control and management of risk, and help investors diversify their investments more effectively by reducing the information asymmetry among them (Bodie & Merton, 1996; Merton, 1995). The more successful the financial structure is in meeting these objectives, the more important its role will be in promoting economic growth. The financial structure is generally viewed from different angles: Bank-based, market-based, financial services, and from the perspective of financial law and the regulatory system. 32.27% of total loans outstanding in Thailand is attributed to the commercial loans taken out by SMEs, which suggests commercial loans as one of the main instruments for SMEs' financing. Hence, highlighting the intimate interaction of SMEs with the market-based view of the relationship between economic growth and financial structure. Moreover, it has long been known that bank credit to general commerce, services, and

manufacturing sectors stimulates economic growth (Patrik, 1966). Therefore, given the main sectors in which Thai SMEs operate (services, manufacturing, wholesale, and retail), there could be a link between credit to SMEs and economic growth, both directly and indirectly.

According to Solow (1956), labor productivity and invested capital are two cornerstones of economic growth. Interest rate, by affecting the cost of saving and borrowing, will eventually influence the amount of the capital available for investment. On the other hand, the cost of exporting and importing will be affected by the exchange rate, changing the available capital for investment. Thus, interest rate and exchange rate are considered as two wings of economic growth. Several studies have substantiated the role of various factors in shaping and directing economic growth. Government expenditures (Jiranyakul, 2013), agriculture (Jatuporn et al., 2011), tourism and terrorism (Fareed et al., 2018), foreign direct investment and trade openness (Yusoff & Nuh, 2015) are a few examples of such factors. However, from empirical point of view, the true impact of interest rate and exchange rate on the growth is of debate. Both positive and negative nexus between interest rate and economic growth have been documented in the literature (Tan et al., 2020; Nguyen, 2019; Lee & Werner, 2018; Abeygunawardana et al., 2017). In the same vein, mixed empirical findings about the nature of the linkage between exchange rate and economic growth have been presented (Morina et al., 2020; Razzaque et al., 2017; Fasanya et al., 2014). Consequently, the investigation of the relationship among economic growth, exchange rate, and interest rate, in case of Thailand, is of interest.

Interest rate and money supply represent two important tools of policymakers to implement the required monetary policy adjustments. Moreover, the relationship

between the M2 classification of money supply and the exchange rate is well established. Thus, to include the monetary-policy-related image of the Thai economy along with the exchange rate, in this study, we focus on money supply.

Considering the importance of SMEs to Thailand, this thesis examines the dynamic behavior of economic growth, credit to SMEs, real interest rate and money supply (M2) and captures the interactions among them. For this purpose, the ARDL analysis is conducted. This study stands out from current studies in the literature in terms of variable selection and provides valuable insights into the dynamics of Thai economic growth for both policy makers and economic agents.

The remaining sections of this thesis are as follows: In the next chapter, we'll take a quick look back at what's already been written on the factors we're studying. Data and procedures for this investigation will be presented in Chapter 3. The empirical findings will be illustrated in chapter four, and the conclusions and closing remarks will be presented in chapter five.

Chapter 2

LITERATURE REVIEW

In many developing countries, like Thailand, small and medium-sized businesses (or "SMEs") are regarded as the economy's "backbone." They are responsible for a sizeable amount of the gross domestic product and employment in these countries. However, SMEs sometimes need help acquiring loans from financial institutions, which can be detrimental to their expansion and development. This is especially pertinent in the case of Thailand, where it has been determined that small and medium-sized enterprises are a vital engine of economic growth and new jobs. In recent years, Thailand's government has enacted various measures to assist the growth of SMEs, including giving access to loans.

Nevertheless, additional research is still required to comprehend SMEs' intricate effects on the expansion of the Thai economy. This literature review will concentrate on the most current and pertinent studies that have been conducted about the effect of credit access for SMEs, interest rates, and monetary supply on economic growth in Thailand. By doing a literature review, our primary objective is to improve our comprehension of the connection between the elements and the growth of the Thai economy as SMEs are essential drivers of economic expansion and job creation in many countries, including Thailand. However, one of the most significant challenges that SMEs confront is the need for more access to capital from various financial institutions. This can harm their growth and development, which in turn has

repercussions for the economy's expansion. Huggings and Thompson (2010) thoroughly analyzed the relevant literature and found that accessibility to finance is one of the biggest barriers to SME growth in the global economy.

The SMEs' sector in Thailand significantly contributes to the country's gross domestic product (GDP) and employment rates. Access to credit is one of the many policies the Thai government has established as part of its more considerable effort to foster the expansion of small and medium-sized businesses in the country. Nevertheless, more significant research is necessary to appreciate the impact credits to SMEs will have on the expansion of Thailand's economy. The fact that limited access to credit is one of the factors that slow the rise of productivity in developing nations highlights the importance of addressing this problem in Thailand. A previous study on the effect of credit access on the growth of SMEs and economic growth has yielded inconsistent findings. Grimm and Seigel (2017) found no meaningful association between the two, whereas, Savlovschi and Robu (2011) discovered that an increase in the availability of loans for SMEs leads to an increase in economic growth. According to Savlovschi and Robu (2011), SMEs play a unique role in modern economies. The growth of these businesses is essential to the growth and development of the economy as a whole. They also found that SMEs are responsible for creating a sizeable number of jobs and contributing to the economic diversification that helps mitigate the effects of economic downturns. However, as was discussed before, it can be challenging for SMEs to obtain loans from financial institutions.

One of the biggest problems SMEs have is a lack of access to capital, which can stunt their expansion, say Savlovschi and Robu (2011). According to the conclusions of the study, in order for governments and financial institutions to facilitate financial access

for SMEs more effectively, they must first understand how SMEs are financed. Karadag (2020) scrutinized main indicators of SMEs sector's performance. The author used a sample including main developing and emerging economies. Karadag (2020) pointed out the close relationship between economic growth and SME sector development. Tambunan (2008) studied the development of SMEs in less developed countries (LDCs). The study demonstrated the positive impact of GDP per capita and government development spending on SME growth. The study identified three reasons why SMEs in LDCs can survive and even grow in the long run under challenging conditions. First, the ability of SMEs to create a niche market. Second, SMEs are seen as providers of jobs for the poor. Third, their production linkages in the form of subcontracting help them grow side by side with larger companies.

Kasemsap (2020) examined the impact of governmental policies on SME loan availability in Thailand. The paper claims that government initiatives like loan guarantees and tax cuts have facilitated SME access to financing. To successfully support SME access to finance, the research underlines the need for further legal changes and institutional reforms. This study suggests that more work is needed to effectively address the issue of limited credit availability for SMEs in Thailand, but it also supports the idea that government aid may be crucial in finding a solution. others showing no significant relationship. To completely comprehend the relationship between credit availability and Thailand's economic growth, as well as the best policies and actions to increase SME access to funding, further research is necessary.

Research by Taiwo et al. (2016) on the effects of SME financing on Nigeria's economic growth shows that SMEs play crucial roles in developing and transitioning economies by supplying over 90% of all jobs and contributing significantly to GDP. Human

capital that SMEs represent may be more significant for economic growth than the proportional size of the SME sector, as was observed by Cravo et al. (2010), who also showed a negative correlation between the relative importance of SMEs in Brazil and economic growth. These studies show the complex relationship between SMEs and economic growth, showing the importance of SMEs' levels of human capital, access to financing, and trust between loan managers and SME management. According to a study by Gherghina et al. (2020), investments had a positive effect on turnover for active Romanian businesses, especially SMEs, between 2008 and 2017. The group was created for all currently operating companies on a national scale, as well as for micro, small, medium, and big enterprises. The study also found that, although there was no statistically significant association for SMEs, spending on innovation had a positive impact on turnover for all firms, particularly big corporations. Another study (Myslimi & Kaçani, 2016) found that SMEs have a significant impact on the socioeconomic growth of a nation by creating jobs, competing with big businesses, joining the international market, and boosting exports. The study also found that, although huge businesses are more competitive than SMEs, SMEs have an influence on major and micro enterprises in Albania's economic growth. These studies show that investments and innovation positively affect the economic growth of SMEs, however the effects of SMEs on economic growth vary by country and industry.

Studies on the significance of SMEs in economic growth and employment creation have produced contradictory results. SMEs have a significant role in job creation and have a positive correlation with declining unemployment and rising income levels, according to Al-Haddad et al. (2019). However, studies like Davis et al. (1996) have shown that conventional wisdom about small businesses' capacity to produce employment is based on inaccurate readings of data and that huge plants and

companies account for the bulk of both newly generated and removed manufacturing jobs. Furthermore, Qureshi and Herani (2011) found that SMEs contribute significantly to the socioeconomic stability of Karachi, particularly through creating jobs and raising the city's GDP. The development of SMEs should be encouraged via policies and interventions since they have the potential to be a significant driver of economic growth and job creation. Other research has frequently shown the critical role SMEs play in economic development and progress. SMEs make up a significant share of the private sector in many developed and developing countries, according to Beck and Demirguc-Kunt (2006), although they often have greater growth restrictions and have less access to formal sources of external finance. The paper claims that financial and institutional development may help lessen these growth constraints and increase SMEs' access to outside funding, leveling the playing field for businesses of all sizes. Another study, Van Scheers (2016), found a link between economic development and SME success in South Africa. The study's findings suggested that increasing the success rate of SMEs might boost the nation's sluggish economy. Similarly, Zafar and Mustafa (2017) found that SMEs make up over 89.5% of all businesses in Pakistan and are responsible for 38% of the country's GDP as well as 70% of non-rural employment. The paper also emphasizes how crucial finance availability is to the growth of SMEs and, therefore, Pakistan's economy.

In addition, research has shown that administrative and regulatory barriers and financial ones are among the most significant obstacles for small and medium-sized businesses when it comes to gaining access to financing. One study, for instance, found that the need for an adequate legal and regulatory framework in Thailand and a lack of information access are significant barriers to SMEs' access to financial resources. This highlights the necessity for a holistic approach that addresses financial and non-

financial barriers to improve access to SME financing in Thailand. According to the research that has been done, factors such as interest rates and monetary policy can significantly impact an economy's expansion. On the other hand, the connection between these factors and the expansion of Thailand's economy still needs to be understood entirely.

According to the findings of previous studies, monetary policy can have a significant bearing on the rate of economic expansion in a particular region. For example, Abeygunawardana et al. (2017) researched the macroeconomic consequences of monetary policy unexpected movements in South Asia. They concluded that monetary policy significantly impacts economic growth in the region. This was one of the findings of their study. Additionally, the relevance of interest rates and monetary policy was highlighted in the conceptual framework that Bodie and Merton (1996) developed to research the current state of the global financial system. They stressed the significance of monetary policy in building an environment that is financially stable and beneficial to the advancement of the economy. They maintained that monetary policy might stimulate economic growth by maintaining a stable financial environment, which in turn would encourage investment and consumption, culminating in the expansion of the economy; as per Diebolt and Hippe's (2022) research, human capital has a positive effect on the rate of innovation and economic growth across Europe's regions. They argued that the monetary policy might be used to facilitate the growth of human capital and the economy. Fareed et al. (2018) found that monetary policy can favor economic growth, particularly in Thailand's tourism industry. This effect was particularly noticeable in the hospitality sector. In addition, Fasanya et al. (2013) found that monetary policy has the potential to favor the expansion of Nigeria's economy. They hypothesized that the monetary policy might

stimulate economic expansion by piquing consumers' and investors' interest in spending and investing more. This is in line with Flammang's (1979) study, which analyzed the relationship between economic growth and economic development and concluded that monetary policy could substantially support economic growth. This result aligns with Lee and Werner (2018), in which the connection of interest rate and nominal GDP in several countries is substantiated. Merton (1995) emphasized the significance of monetary policy's function in his conceptual framework for evaluating the current state of the global financial system. He emphasized the significance of monetary policy in processing an environment that is financially stable and beneficial to the economy's advancement. According to Morina et al. (2020), currency rate fluctuations negatively impact economic growth in CEE nations. They asserted that monetary policy could be used to both stabilize the currency exchange rate and encourage economic growth. According to the findings of Nguyen et al. (2019), monetary policy has the potential to contribute favorably to the expansion of Vietnam's economy, which shares many similar characteristics to the economy of Thailand.

As per the literature reviewed and the research conducted, the government's monetary policy can significantly impact the rate at which the Thai economy expands. Additional research is required to understand the relationship between these factors and economic growth in Thailand, as well as the policies and interventions that can be utilized to promote economic growth in Thailand. Likewise, this understanding is essential to formulate effective strategies for promoting economic growth in Thailand.

Chapter 3

METHODOLOGY

This section briefly describes the methodology used in this research. We categorized this chapter into two general parts: Unit root tests and ARDL.

3.1 Unit root tests

The Augmented Dickey-Fuller (ADF) test (Dickey-Fuller, 1979), in the most generalized form, includes a drift term with a deterministic trend. Equation 1 characterizes the ADF representation of order Q:

$$y_t = \pi_0 + \pi_1 t + \omega_1 y_{t-1} + \sum_{j=1}^{Q} \omega_{j+1} \Delta y_{t-j} + \vartheta_t \quad (1)$$

Where π_0 is the drift term, and $\pi_1 t$ represents the deterministic trend. Furthermore, ϑ_t is the residual term.

Under its null hypothesis in which the presence of a unit root is supposed, the ADF test assumes ω_1 is equal to 1. If ω_1 is not statistically different from 1, we conclude the unit root behavior of the series.

An extension to ADF test is the Dickey-Fuller Generalized Least Squares test (DF-GLS) (Elliott et al., 1996). In ADF-GLS the assumptions of no serial correlation and homoscedasticity of the residuals can be violated because of the robustness of the GLS estimator to such violations. Furthermore, the effectiveness in small sample and higher asymptotic power compared with the conventional ADF are among properties of DF-GLS.

In contrast with ADF test which assumes a known distribution to estimate the autoregressive structure, the unit root test of Phillips and Perron (1988) proceeds non-parametrically to approximate the residuals. In the Phillips-Perron test, the test statistic is modified for heteroscedasticity and autocorrelation. Equation 2 displays the Phillips-Perron test's regression representation.

$$\Delta Y_t = K' D_t + \rho Y_{t-1} + \theta_t \quad (2)$$

Where, θ_t is I (0) and may have a time-varying conditional variance.

The null hypothesis of KPSS unit root test (Kwiatkowski et al., 1992) specifies that either the series is trend stationary or it doesn't contain unit root. KPSS decomposes the series into a deterministic trend, a random walk process, and a stationary error term. The following equation represent the regression equation for the test.

$$\sigma_t = \mu(t) + \omega_t + \varepsilon_t \quad (3)$$

With $\mu(t)$ and ω_t being the deterministic trend and the random walk process, respectively.

3.2 ARDL

Under the regression analysis framework, Autoregressive Distributed Lag (ARDL) model is the culmination of Auto Regressive (AR) and Distributed Lag (DL) models, as ARDL takes both AR and DL data generating processes into the account. Put it simply, the dependent variable can be explained by its own lagged values as well as contemporaneous or/and lagged values of other variables. The following equation indicates the structure of ARDL (p, l), where l is the transpose of$(q_1 , q_2 \ \ldots . , q_n)^{'}$.

$$Y_t = C_0 + \mathrm{C}\, t + \sum_{i=1}^{p} \tau_i \, Y_{t-i} + \sum_{j=1}^{n} \sum_{z=0}^{q_j} \rho_{j,z} \, X_{j,t-z} + \varepsilon_t \quad (4)$$

To verify the presence of a long-run relationship, we employed the F-Bounds test of Pesaran et al. (2001). The F-bounds test is an extension of the conventional

cointegration F-test in the context of ARDL. Assuming no long-run relationship, the test builds on the non-standard asymptotic joint F-statistic. The test compares the F-statistic of a reduced form of the ARDL model with two upper and lower bounds. If the test statistic exceeds the upper bound, we reject the null of no cointegration. In contrast, if the test statistic falls lower than the lower bound we cannot reject the null hypothesis, and if the test statistic lies between the two bounds we have an inconclusive inference.

Chapter 4

DATA AND EMPIRICAL FINDINGS

In this section, first we describe the sample used in this research, and then we will define each variable briefly. Thereafter, the findings are presented and discussed.

4.1 Data

This study examines the relationship between economic growth and credit to SMEs (SMECR) in Thailand. Economic growth is represented by the change in gross domestic product (GDP). To increase the explanatory power of the analysis, we also added two selected macroeconomic variables: money supply (M2) and real interest rate (IR). Data were collected from the first quarter of 2013 to the third quarter of 2022 at a quarterly frequency. The choice of the data period was based on the availability of the data. In addition, we obtained the data from the website of the Central Bank of Thailand (www.nesdc.go.th). In this study, we used the natural logarithm of the variables as a smoothing filter to scale the data and reduce the impact of their undesirable behaviors. In this sense, LNGDP denotes the natural logarithm of GDP, LNSMECR denotes the logarithm of SMECR, and LNIR and LNM2 refer to the logarithms of IR and M2, respectively. All series are adjusted seasonally.

As one of the fundamental concepts in economics, the growth of the economy is defined as a rise in gross domestic product. Economic growth is inherently a multidimensional concept, as it can be related to various economic factors such as money supply, interest rate, human capital and technological progress, income

inequality, trade openness, and environmental sustainability. Consequently, there are valuable benefits to policymakers in gaining more insight into the intricacies of economic growth. SMECRs are generally financing provided by financial institutions. In this regard, commercial banks have a significant share of SMECRs in Thailand. Generally, SMEs use this financing for investment in technology and/or equipment, expansion, or as working capital to run their day-to-day operations. In addition, money supply refers to the amount of money circulating in an economy. M2, as one of the proxies for money supply, includes cash, cash equivalents, and highly liquid assets such as savings deposits and money market securities. The interest rate, simply put, is the price of a domestic currency based on that domestic currency. The interest rate is considered an instrument for managing the economy.

4.2 Empirical findings

Figure 1.4 depicts the fluctuations of the logarithmic form of each variable over the sample period. A major upward trend is observed for all variables, with various minor trends of both signs in shorter periods. The upward trend of LNGDP characterizes the recent economic growth of Thailand. Furthermore, LNSMECR exhibits a co-movement with LNGDP until around 2020, while it detaches from it afterwards. This detachment begs more questions about the interaction between LNGDP and LNSMECR.

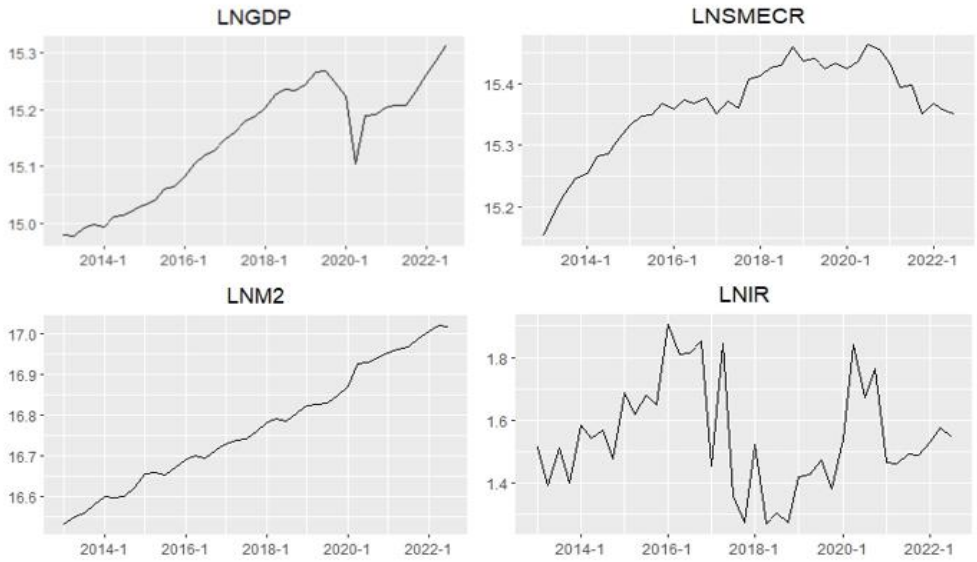

Figure 1. Time-series graphs
Note: This figure depicts the logarithmic form of each variable's time-series graph.

Table 1.4 reports descriptive statistics for the variables, including Jarque-Bera test statistics. The Jarque-Bera test, under the null hypothesis, assumes that the series has a zero skewness and excess kurtosis. Hence, hypothesizing the normality of the series. According to Jarque-Bera test results, we reject the normality only for LNSMECR at the 1% significance level.

Table 2. Descriptive statistics

	LNGDP	**LNSMECR**	**LNM2**	**LNIR**
Mean	15.1445	15.363	16.771	1.5473
Median	15.179	15.367	16.758	1.520
Std. Dev.	0.101	0.0748	0.1461	0.1723
Jarque-Bera	3.169	7.270***	2.205	1.603

Note: This table displays the descriptive statistics for each variable, where *** denotes the rejection of the null hypothesis at the 1% significance level.

Table 2.4 demonstrates the Pearson's correlation matrix. Assuming a linear relationship between LNGDP and LNSMECR, the two variables have a high

association. Moreover, LNGDP indicates a highly-powerful correlation with LNM2 and a negative relationship with LNIR, which aligns with our expectations. Because, when money supply increases, the available money for investment and spending increases in the economy, which appears as a supportive force for economic growth. The cost of borrowing money goes up when interest rates go up, which dampens economic expansion. Furthermore, LNSMECR is inversely linked with LNIR. Borrowing costs may be to blame for the inverse relationship between LNSMECR and LNIR; as interest rates rise, so do borrowing costs, and therefore, fewer SMEs will be able to afford credit. The collinearity between LNSMECR and LNM2, however, is complex. One the one hand, the negativity between LNSMECR and LNM2 could be explained by the crowding out effect, inflation and risk. An increase in M2 increases competition for credit, and SMEs may have difficulty accessing credit compared to larger firms. An increase in M2 also potentially leads to inflation, which may reduce nominal demand for the goods and services offered by SMEs. Therefore, SMEs will need less credit or lenders will be reluctant to lend to SMEs as their financial risk increases and/or the value of SMEs' collateral decreases. Our findings also revealed a favorable relationship between LNSMECR and LNM2, which would make sense from an investment's point of view. When money supply abounds, economic agents are more likely to invest their money on SMEs in the form of credits. Consequently, as M2 rises, LNSMECR also rises. Moreover, ceteris paribus, with an increase in M2 the price of money will decrease. This is reflected in the negative correlation between the two variables.

Table 3. Pairwise correlations

	LNGDP	LNSMECR	LNM2	LNIR
LNGDP	1			
LNSMECR	0.773	1		
LNM2	0.866	0.697	1	
LNIR	-0.271	-0.014	-0.056	1

Note: This table indicates the Pearson correlation coefficient for each pair of the variables.

The unit root test outcomes are outlined in Table 2.4. To find evidence that the shocks have remained persistent at level and first difference, we performed several unit root tests. In all tests, we considered a deterministic trend with a constant, and a maximum lag of 9 was chosen for each test. According to the results of the ADF test, we failed to reject the null hypothesis for the levels of all variables except LNNIR. In contrast, when considering the first differences, we reject the presence of a unit root at the 10% significance level for LNSMECR and at the 1% significance level for the other series. According to the results of the DF-GLS test, LNGDP, LNSMECR and LNM2 are unit root stationary. On the contrary, the shocks to LNIR dissipate rapidly. In the nonparametric Phillips-Perron test, the bandwidth was estimated using the Bartlett kernel. In addition, a linear trend and a constant exogenous variable were included in the test. In the test, we utilized MacKinnon's (1996) one-sided p-values, with the null hypothesis assuming the presence of a unit root in the series. According to the test results, we could not reject the null hypothesis for any variable at the level, except for LNIR. However, considering their first differences, we found sufficient evidence to reject the unit root behavior of LNGDP, LNSMECR, and LNM2 at the 1% significance level. Ultimately, the KPSS test suggests stationarity of LNIR at the level and stationarity of LNGDP and LNSMECR in the first difference form. Having taken the limitations of each test into account, we identified a mixed order of integration for

the variables, with LNGDP, LNSMECR, and LNM2 being I (1) and LNIR being I (0). This finding leads us to an ARDL framework (Pesaran et al., 2001) developed for dealing with variables with mixed integration order. The ARDL approach has two major advantages that make it an appropriate method for this study. First, its documented strength when the series are I (1) and I (0) (Pesaran et al., 2001). Second, its robustness when the number of observations is small, as is the case in this study (Narayan & Narayan, 2005). Accordingly, we employed ARDL framework to investigate the long-run interaction of the variables.

Table 4. The unit root test results

	LNGDP	**LNSMECR**	**LNM2**	**LNIR**
ADF (X)	-1.925	-0.897	-2.485	-3.562***
ADF (ΔX)	-6.791***	-3.415*	-6.222***	-10.486***
DF-GLS (X)	-1.972	-0.983	-2.555	-3.642**
DF-GLS (ΔX)	-6.889***	-3.184*	-5.524***	-10.346***
PP (X)	-1.953	-1.479	-2.450	-3.697***
PP (ΔX)	-6.792***	-8.087***	-8.125***	-10.720***
KPSS (X)	0.133*	0.207**	0.165**	0.077
KPSS (ΔX)	0.084	0.111*	0.372***	0.052

Note: This table presents the test statistic for various unit root tests.
***, **, and * denotes the rejection of the null hypothesis at the 1%, 5%, and 10% significance level.

Table 4 reports the coefficients estimated for the ARDL model. To estimate the coefficients, we chose a maximum lag of 4, and employed ARDL's LS estimator. According to this table, not sufficient evidence was found to reject the insignificance of $LNSMECR_{t-1}$. In contrast, other time-series are significant at the 5% significance level.

Table 5 The ARDL result

Variable	Coefficient
$LNGDP_{t-1}$	0.697***
LNSMECR	0.676***
$LNSMECR_{t-1}$	0.021
$LNSMECR_{t-2}$	0.577***
LNM2	-2.298***
$LNM2_{t-1}$	2.171***
$LNM2_{t-2}$	-1.183***
$LNM2_{t-3}$	0.894***
$LNM2_{t-4}$	0.677***
LNIR	-0.021*
C	1.570*

Note: This table presents the test statistic for various unit root tests.
*** and * denote the rejection of the significance of the coefficients at the 1% and 10% significance level, respectively.

Since the ARDL model employs the least squares estimator a priori, we test the residuals for serial correlation and heteroscedasticity based on the requirements of the model to ensure the unbiasedness and efficiency of the estimates. In this regard, we ran the BPG heteroscedasticity test (Breusch & Pagan, 1979) and the LM serial correlation test of (Breusch, 1978). The maximum order of 4 was chosen for the serial correlation test. According to table 4.4, using BPG test, we could not reject the null hypothesis of homoscedasticity at the 5% significance level. Furthermore, we could not reject the null hypothesis of no autocorrelation. Therefore, both test results are in line with the model requirements.

Table 6 The BPF and LM test results

	Test statistic
The heteroscedasticity test	2.343*
The serial correlation test	1.006

Note: *** and * denotes the rejection of the null hypothesis at the 1% and 10% significance level, respectively.

To examine the presence of a cointegarating vector, we made use of F-Bounds test of (Pesaran et al., 2001). The results are summarized in Table 5.5. The lack of a level of cointegration is rejected at the 5% level of significance due to the fact that the F statistic is larger than the I (1) critical value. Consequently, there must be an equilibrating vector of variables in long-run.

Table 7 F Bounds test results

	The significance level	I(0)	I(1)
F-statistic = 4.709 (Asymptotic: n=1000)	10%	2.37	3.2
	5%	2.79	3.67
	2.50%	3.15	4.08
	1%	3.65	4.66

Note: This table shows the F Bounds test statistic, different significance levels, and their corresponding critical values.

Table 5.4 characterizes the levels equation, where the EC term is described as follows:

EC=LNGDP (0.398 LNCMECR+0.861 LNM2 0.002 LNIR 5.188)

According to table 5.4, stepping towards the long-run equilibrium, LNSMECR and LNM2 adjust LNGDP, considering 5% significance level. In summary, 1% increase in LNSMECR will cause 0.398% rise in LNGDP ceteris paribus. To put it differently, if credits to SMEs doubles, it will bring an economic growth of 39.8% in long term. Moreover, the insignificant relationship between LNIR and LNGDP could be due to a non-linear structure between LNIR and LNGDP, as such a relationship could be affected by trade policy, government spending, inflation, and monetary policy. We should note that the economy is a dynamic entity and the strength of the relationships may vary in some periods. For LNSMECR and LNM2, we found a positive significant

long run association. This could be explained by the increase in economic activity as the money supply increases. However, the strength of this relationship is a function of the state of the economy and government policy.

Table 8. Levels equation

Variable	Coefficient
LNSMECR	0.398**
LNM2	0.861***
LNIR	0.022*
C	5.188*

Note: *** and * denote the rejection of the significance of the coefficients at the 1% and 10% significance level, respectively.

Moreover, to shed light on the behavior of the model with respect to disequilibrium, we also estimated the A_{RDL} error correction regression. As shown in Table 4.5, the error correction (EC) term is significant at the 5% significance level and has a coefficient of 0.271. Thus, about 27.1% of the deviations from long run equilibrium are corrected in one period.

Table 9. The estimation of the conditional error correction form

Variable	Coefficient	Std. Error	t Statistic
C	1.570	1.067	1.472
$LNGDP_{t-1}$	0.303	0.101	3.004***
$LNSMECR_{-1}$	0.120	0.094	1.284
$LNM2_{t-1}$	0.260	0.068	3.838***
LNIR	0.001	0.022	0.026
$\Delta LNSMECR$	0.676	0.227	2.982***
$\Delta LNSMECR_{t-1}$	0.577	0.221	2.610***
$\Delta LNM2$	2.298	0.344	6.686***
$\Delta LNM2_{t-1}$	0.387	0.415	0.933
$\Delta LNM2_{t-2}$	1.571	0.383	4.099***
$\Delta LNM2_{t-3}$	0.677	0.383	–1.766*
The EC term	0.271	0.029	5.412***

Note: *** and * denote the rejection of the significance of the coefficients at the 1% and 10% significance level, respectively.

Chapter 5

CONCLUSION

This thesis examined the potential contribution of credits to SMEs (LNSMECR) to long-run economic growth in Thailand. To asses this potential relationship, we added M2 classification of money supply (LNM2) and real interest rate (LNIR) as two other explanatory variables for Thai economic growth. The study drew on data samples collected quarterly between 2013 Q1 and 2022 Q3. Since the unit root test results steered us towards concluding a mixed order of integration for variables, we applied the ARDL framework of Pesaran et al. (2001), which is a robust method when facing I (1)- I (0) mixed orders and small samples (Narayan & Narayan, 2005).

The conclusions drawn from the empirical findings of this study provide valuable insights to policy makers on the SME-economic growth dimension of the Thai economy. Thai policymakers should consider the important role of SMEs when formulating policies to promote economic growth. By relaxing the requirements for SMEs to acquire finance, the Thai government can not only benefit from the efficiency caused by SMEs in the real sector, but also take an important step toward long-term economic growth. Moreover, the loans can also be financed through the government budget or in the form of subsidies. Such expenditures may be uncomfortable for the economy in the short run, but based on our empirical results, they will promote growth in the long run. Since the shocks to the LNGDP and LNSMECR are persistent, favorable shocks have a reinforcing effect on their conditional means. This

underscores the importance of efficient long-term strategies with respect to LNSMECR and LNGDP. In summary, this study joins the ranks of studies demonstrating the role of increased lending to SMEs in promoting economic growth. Moreover, according to our results, the insignificant long-run effect of LNIR on LNGDP underscores the higher efficiency of monetary policy implemented directly through money supply. This study could be extended by applying a non-linear methodology to capture the nuances of such economic interactions.

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